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TITLE: Remote Sensing Geophysics from Skylab

INVESTIGATION NO.: 487

PERIOD COVERED: December 1973

(E74-10226) REMOTE SENSING GEOPHYSICS
FROM SKYLAB Monthly Report, Dec. 1973
(Geological Survey) 3 p HC \$3.00

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TYPE OF REPORT: Monthly

Status during December

1. Last month we reported the detection of two reflectance anomalies in channel 11 screening of Skylab 2 S-192 data. A thorough search of the S-192 Skylab 2 images was conducted to see if high reflectivity anomalies could be detected. At the same time the Skylab 3 S-192 data arrived and was included in the search. As of this time a total of 21 reflectivity anomalies have been found on the Skylab images (channel 11, 1.55-1.75 μm). Of the 21 anomalies, 4 appear to be in vegetated areas whose geology is mapped as welded ash-flow tuffs and one is in a vegetated area mapped as lake deposits. It is possible that the vegetation is causing the anomaly. One other anomaly is in mapped felsic rocks. The remaining 16 anomalies are in andesitic or more mafic rocks.

With these results in mind a more thorough catalog of the anomalies on the ERIM data previously acquired of our southern California site and Skylab images of our Nevada site was made, with the following results: of 104 anomalies on all the images, 5 are described in the discussion above. The remaining 99 occurrences are either in andesite or in basalts (usually non-vegetated). Of the 27 occurrences in basalt, at least 20 are in basaltic cinders as opposed to flow basalts.

As has been stated in previous monthly reports, the only likely, naturally occurring materials that produce reflection spectra at all similar are limonite and hematite. Further, in order to produce such high reflectivity in the 1.0-2.6 μm region, it is necessary for the individual particles to be micron size. This small size suggests an emplacement process other than by weathering.

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The most realistic explanation for the emplacement of such colloidal sized particles in a volcanic environment is by sublimation during outgassing. It seems possible that the anomalies are caused by fumarolic activity.

2. We have made several improvements in our computer thermal model in order to correct for topographic effects. It appears possible that reflectance data acquired at the same time as the thermal data can be used to do the topographic adjustment at least in areas of low to moderate relief.

Requirements

1. No S-192 thermal data (either tape or film strip) has been received yet.